

# P R O J E C T facts

DEPARTMENT OF ENERGY  
OFFICE OF FOSSIL ENERGY

ADVANCED power  
S Y S T E M S

## BABCOCK & WILCOX—ADVANCED COAL-FIRED LOW EMISSION BOILER SYSTEMS FOR TOMORROW'S POWER PLANTS

### PRIMARY PROJECT PARTNER

Babcock & Wilcox  
Alliance, OH

### MAIN SITES

Alliance, OH  
Barberton, OH

### TOTAL ESTIMATED COST

\$57,795,000

### COST SHARING

DOE	\$34,296,000
Non-DOE	\$23,499,000

### Project Description

Babcock & Wilcox is developing the next generation of highly advanced, coal-fired boiler systems, incorporating new, high-performance control technologies that will result in an ultraclean and efficient coal-based technology for tomorrow's power plants. These new power plants, called Low Emission Boiler Systems (LEBS), are based on industry-proven and accepted pulverized coal-combustion technology.

In recent years, several innovative acid-rain emissions-control technologies have been demonstrated in the Department of Energy's Clean Coal Technology Program and elsewhere. Most of these advanced systems have been designed as retrofits to existing boilers.

In Babcock & Wilcox's new boiler system, these pollution-control advances are integrated into an original design. Because the entire plant is being designed around the new technologies, each subsystem can be optimized without the constraints imposed by retrofitting into an existing boiler. The result will be a coal-fired boiler with unprecedented environmental performance.

Babcock & Wilcox is developing a limestone injection dry scrubbing system to reduce sulfur emissions by 97% while using the least expensive sulfur sorbent, limestone. Beginning with its commercial DRB-XCL burner as a base for development, the company is producing an advanced low-NOx burner design with staging that will ensure emissions levels much lower than those of their existing commercial burner technology.

### Program Goal

DOE's strategic plan aims not only to ensure a reliable and affordable energy supply for the U.S., but also to minimize environmental impact. The highly advanced coal-fired Low Emission Boiler System will achieve significantly lower emissions and higher plant efficiencies than conventional units. It will also place our Nation in a strong position for supplying power-generation and environmental-control systems in a rapidly expanding world market.

### Project Partner

RAYTHEON ENGINEERS & CONSTRUCTORS, INC.  
Denver, CO  
(balance-of-plant and architect-  
engineering services)

# BABCOCK & WILCOX—ADVANCED COAL-FIRED LOW EMISSION BOILER SYSTEMS FOR TOMORROW'S POWER PLANTS

## CONTACT POINTS

E. Larry Davison  
Babcock & Wilcox  
Alliance, OH  
(330) 829-7617  
(330) 829-7801 fax  
larry.davison@mcdermott.com

Lawrence A. Ruth  
U.S. Department of Energy  
Pittsburgh, PA  
(412) 892-4461  
(412) 892-5917 fax  
ruth@petc.doe.gov

## Project Benefits

In the near future, the United States will have to build a new generation of coal-based power plants to replace its aging units. Coal supplies more than 56% of the Nation's electricity, and, because of our abundant reserves, it will remain the dominant source of fuel for power generation well into the next century. A national cap on sulfur and nitrogen oxide emissions, however, will require future coal technologies to be much cleaner than current technologies.

DOE is sponsoring the Low Emission Boiler Systems (LEBS) program to meet these power and environmental needs. Without significantly departing from the traditional design features of pulverized-coal-firing systems, this technology will:

- Reduce sulfur dioxide and nitrogen oxide emissions to a sixth of the level allowed by today's Federal air quality standards (New Source Performance Standards).
- Lower emissions of flyash and other particulates to a third of those allowed by today's standards.
- Significantly improve power plant efficiency—up to 42% from today's level of 35%.
- Produce electricity at costs equal to or less than those of a modern-day coal plant.

LEBS is one of several advanced power-generation systems being developed with support from DOE. Of these systems, LEBS offers the nearest-term commercial option for utilities to meet these performance goals for the new installations. In addition, many of the technologies that are being developed in the LEBS program will be available for retrofit or repowering applications at existing facilities.

Babcock & Wilcox, along with ABB-CE and DB Riley, are leading teams that are independently developing Low Emission Boiler Systems to incorporate each team's unique, preferred technologies. In mid-1997, one of the teams will be selected to construct and operate a proof-of-concept test facility to provide the engineering data needed to commercialize its system by 2000.

## Cost Profile (Dollars in Millions)

	Prior Investment	FY95	FY96	FY97	Future Funds**
Department of Energy *	\$6.3	\$2.1	\$5.1	\$6.9	\$14.0
Private Sector Partners	—	\$0.8	\$1.8	\$6.9	\$14.0

\* Appropriated Funding

\*\* If B&W is selected to perform proof-of-concept (POC) testing, the final phase of the LEBS development effort, a total of approximately \$40 million (\$20 million DOE) will be required, with \$6 million needed in FY97.

## Key Milestones

FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Concept development Preliminary R&D Component testing Commercial generating unit: preliminary design				Subsystem testing Proof-of-concept: facility design Host site selection for proof-of-concept facility		Proof-of-concept facility: revised design Commercial generating unit: revised design		Construction and operation of proof-of-concept facility	